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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,694	08/05/2003	Robert L. Memmen	EH-10895 (03-357)	8373

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EXAMINER	
COMPTON, ERIC B	

ART UNIT	PAPER NUMBER
3726	

DATE MAILED: 08/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/635,694	MEMMEN ET AL.	
	Examiner	Art Unit	
	Eric B. Compton	3726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 13-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 22, the limitation "the applying places a first portion of the first face along the component" is vague and ambiguous, since it is unclear as to which area of the component the first portion should be applied.

Perhaps this limitation should read, "the applying places a first portion of the first face along [the] a remaining intact leading surface of the component." *See* Specification at [0022] ("[T]he backing element 52 may be a metallic (e.g., aluminum) tape having first and second surfaces 53 and 54, a trailing portion of the first surface 53 being secured to a remaining intact leading portion of the suction side surface 34.").

Also, claim 22 is incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. *See* MPEP § 2172.01. The omitted structural cooperative relationships are: the relationship between the "second portion of said first face" to the first portion of said first face of the backing element and/or component. Perhaps this limitation should read "second of said first face protruding beyond a lost leading edge of

the intact leading surface. *See* Specification at [0022] ("A forward portion of the surface 53 protrudes beyond the lost leading edge and an intermediate portion extends aligned with a lost portion of the surface 34 along the original contour of the airfoil.")

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 6-11, 14-16, 19-21 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 2002/076573 to Neal in view of U.S. Pat. 6,754,955 to Carl, Jr. et al.

Neal discloses a method for restoring a Ti alloy turbine blade component, see [0004] (discussing Ti based alloy), which has lost first material from a damage site (3A) comprising:

physically depositing a Ti-based material (31) at least partially in place of the first material. *See* [0034] ("The superalloy repair alloy will generally be chosen to be similar in composition to the original composition of the component being repaired.").

However, the reference does not disclose the applying a backing element to the component protruding adjacent the damage site so that the deposited Ti based material builds up a component and backing element.

Carl discloses a method of repairing a turbine blade tip by building up repair material on a backing plate (26). *See* Figure. 4.

> Referring now to FIG. 4, a chill plate 26 is disposed along the pressure side 28 of the partition in the region in opposition to the removed portion 22 of the trailing edge. Weld material 30 is applied against the chill plate 26 and built up to a thickness sufficient to replace the removed damaged trailing edge portion 22 and sufficient to have surfaces 32 and 34 on the pressure and suction sides 28 and 36, respectively, of the partition in excess of a desired trailing edge configuration. For example, the desired trailing edge configuration can be an originally designed configuration for the partitions of a particular turbine. Once the weld build-up material 30 has been added to each of the partitions undergoing repair, and the copper chill plate removed from the pressure side of the trailing edge of the partition, the weld material of the partitions is ready for contouring to the desired trailing edge configuration.
>
> Col. 4, lines 35-50.

Regarding claims 1, it would have been obvious to one having ordinary skill in the art at the time the invention was made to performed the build up of material of Neal, in light of the teachings of Carl, in order to repair a tip of a turbine blade.

Regarding claims 2, Neal discloses the substrate may be machined, to remove the damaged area. *See* [0026].

Regarding claim 3, in Neal the Ti-based material replaces a major part of the first material.

Regarding claims 6-7, *see* Neal, Figure 3 (the damage site does not appear to be any more than 15% of a span of the airfoil).

Regarding claims 8-10, it is clearly a fortuitous matter as to where the damage site is formed, its size and depth, depending on the service requirements of a particular turbine blade. The above method clearly can be used for any given damage site.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have repaired the turbine, regardless of a particular damage site, in order to repair the site.

Regarding claims 11 and 14, in Neal the physical vapor depositing comprised electron beam physical vapor deposition. [0032].

Regarding claims 15-16, *see* Neal at [0035] (disclosing pressure).

Regarding claims 19-21 and 23-24, these limitations are inherently provided for by the references.

5. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neal & Carl, in further view of an article entitled "EB-PVD Technology in the Gas Turbine Industry: Present and Future" by Movchan.

Neal & Carl disclose the invention cited above. However, the references does not disclose the particular values claimed for depositing rate.

Movchan disclose EB-PVD technology. It is noted that the average rates for condensation of metals is 50-100 μm / min. Page 40 (third column). The term average suggests that rates are at least known above and beyond. Likewise to go slower is envisioned.

Regarding claims 17-18, it would have been obvious to one having ordinary skill in the art at the time the invention was made to performed the EB-PVD of Neal & Carl at the claimed rate, in light of the teachings of Movchan, in order to effectively provide the build up material. "[W]here the general conditions of a claim are disclosed in the prior

art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

6. Claims 1-10, 19-21 and 23-24, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 5,083,014 to Pratt et al. in view of U.S. Pat. 6,754,955 to Carl, Jr. et al.

Pratt discloses a method for restoring a Ti alloy turbine blade (12) component which has lost first material from a damage site comprising:

physically depositing a Ti-based material at least partially in place of the first material. *See* Example 1, Col. 9, lines 45-62 (disclosing depositing Ti-6Al-4V alloy to repair Ti-6Al-4V substrate).

However, the reference does not disclose the applying a backing element to the component protruding adjacent the damage site so that the deposited Ti based material builds up a component and backing element.

Carl discloses a method of repairing a turbine blade tip by building up repair material on a backing plate (26). *See* Figure. 4.

> Referring now to FIG. 4, a chill plate 26 is disposed along the pressure side 28 of the partition in the region in opposition to the removed portion 22 of the trailing edge. Weld material 30 is applied against the chill plate 26 and built up to a thickness sufficient to replace the removed damaged trailing edge portion 22 and sufficient to have surfaces 32 and 34 on the pressure and suction sides 28 and 36, respectively, of the partition in excess of a desired trailing edge configuration. For example, the desired trailing edge configuration can be an originally designed configuration for the partitions of a particular turbine. Once the weld build-up material 30 has been added to each of the partitions undergoing repair, and the copper chill plate removed from the pressure side of the trailing edge of the partition, the weld material of the partitions is ready for contouring to the desired trailing edge configuration.

Col. 4, lines 35-50.

Regarding claims 1, it would have been obvious to one having ordinary skill in the art at the time the invention was made to performed the build up of material of Dibble, in light of the teachings of Pratt, in order to repair a tip of a turbine blade.

Regarding claims 2 and 5, Pratt discloses the substrate may be machined, e.g., by grinding to remove damaged area. *See* Col. 7, lines 25-31.

Regarding claim 3, Pratt discloses the Ti-based major replaces a major part of the first material.

Regarding claim 4, Pratt discloses the Ti-based material is Ti-6Al-4V alloy. *See* Col. 9, lines 45-62.

Regarding claim 6, *see* Pratt, Figure 3 (the damage site does not appear to be any more than 15% of a span of the airfoil).

Regarding claims 7-10, it is clearly a fortuitous matter as to where the damage site is formed, its size and depth, depending on the service requirements of a particular turbine blade. The above method clearly can be used for any given damage site. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have repaired the turbine, regardless of a particular damage site, in order to repair the site.

Regarding claims 19-21 and 23-24, these limitations are inherently provided for by the references.

Allowable Subject Matter

7. Claim 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record of record does not teach or suggest: a method of restoring a Ti alloy turbine component which has lost first material from a damage site comprising:

applying a backing element to the component adjacent the damage site so that the deposited Ti based material builds up on the component and the backing element; and physically depositing a Ti-based material at least partially in place of the first material, wherein

the backing element has a first face;

the applying place a first portion of the first face along [the] a remaining intact leading surface of the component; and

the physically deposition deposits said Ti-based material along a second portion of said first face protruding beyond a lost leading edge of the intact leading surface,

in combination with the other claimed subject matter. *See* Figure 6, below.

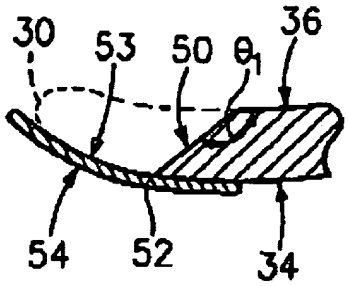

FIG. 6

Response to Amendment

9. The declaration of Neal filed under 37 CFR 1.132 filed June 13, 2006 is sufficient to overcome the rejection of claim 12 (now incorporated into claim 1) based upon the U.S. 2002/076573 to Neal rejection (alone).

Response to Arguments

10. Applicant's arguments filed June 13, 2006, have been considered but they are not found fully persuasive.

Claim 22 is indicated as allowable if rewritten in independent form and by overcoming the 112, second paragraph rejections, as discussed above.

However, claim 1 (amended) merely recites, "applying a backing element to the component protruding[1] adjacent the damage site" rather than securing or attaching the

[1] The term "protruding" means "to jut out form the surrounding surface or context." Merriam-Webster's Collegiate Dictionary, 10th ed. (1999) (2d definition of protrude). Clearly, the backing element of Carl juts out from the surface of the turbine blade to be repaired.

backing element to the component to a bordering sidewall as discuss by Applicant. *See e.g.,* Specification at [0022] ("[T]he backing element 52 may be a metallic (e.g., aluminum) tape having first and second surfaces 53 and 54, a trailing portion of the first surface 53 being secured to a remaining intact leading portion of the suction side surface 34."). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *See In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In Carl, the backing element (26) is clearly disposed (or applied) adjacent to the damaged area. *See* Figure 4 (showing backing element (26) placed at edge of turbine blade to be repaired), for the same purpose that Applicant relies, *i.e.*, to form a molding surface for the newly applied material. Furthermore, in Carl the newly applied material is built up on the backing element (26) in addition to the rest of the turbine blade to be repaired, at least at the interface. It is inherent that the backing element (26) is placed sufficiently close to the edge of the turbine blade to be repair for this to happen, otherwise if there was a gap than the newly added material would not be able to connect with the blade.

Thus, Carl clearly teaches the above claim limitation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (571) 272-4527. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Bryant can be reached on (571) 272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Eric B. Compton
Primary Examiner
Art Unit 3726

ebc